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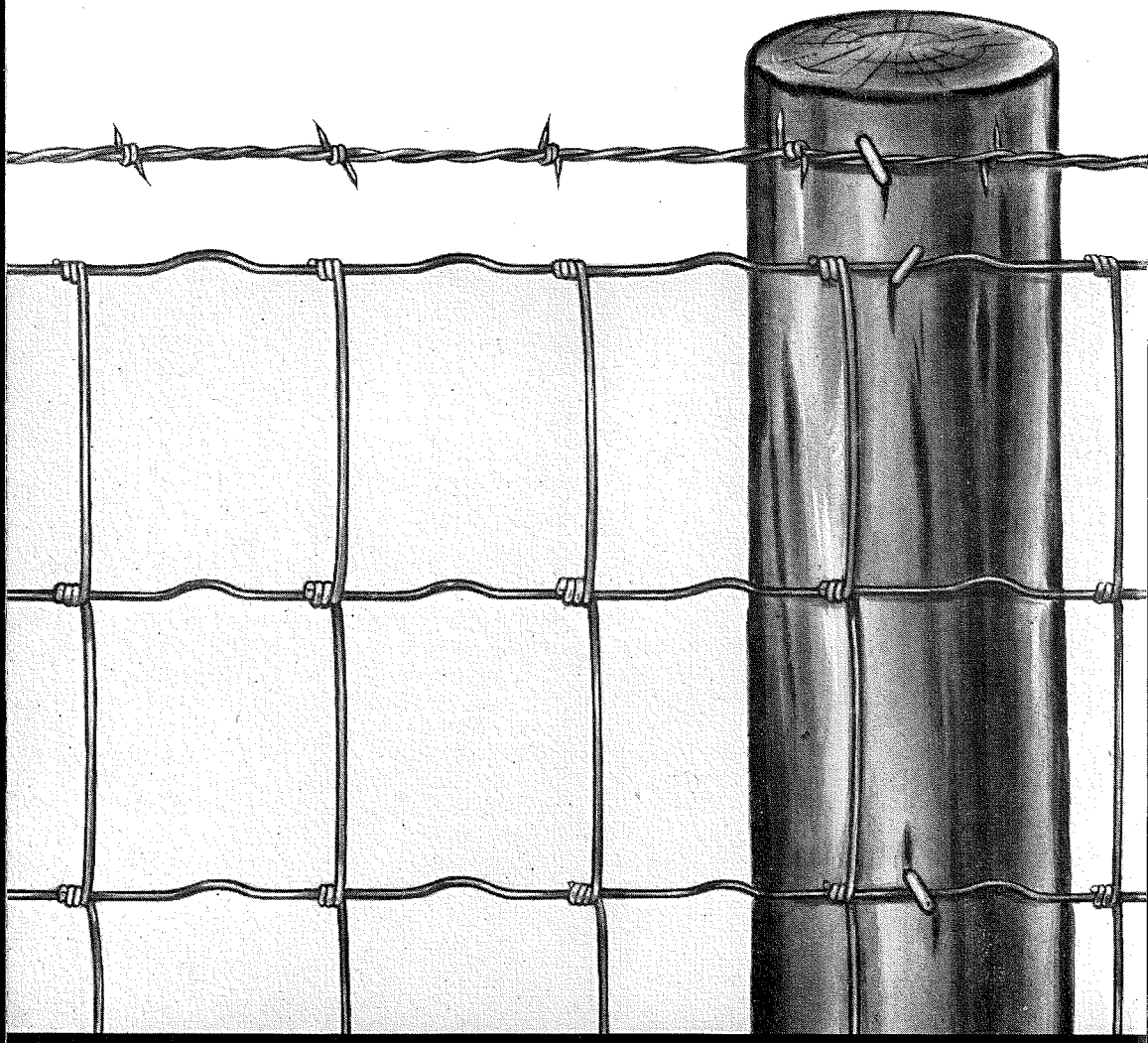
Building Better FARM FENCES

By John R. Neetzel



UNIVERSITY OF MINNESOTA
AGRICULTURAL EXTENSION SERVICE ★ U. S. DEPARTMENT OF AGRICULTURE

Building Better FARM FENCES

John R. Neetzel [1]

MUCH HAS BEEN DONE during the last half century to improve the quality and to increase the service life of fencing materials. Fence wire and fasteners have been greatly improved. Treated wood posts which will last 20 to 30 or more years are coming into wider use.

In contrast, little improvement has been made in fence construction methods. Improvements of this kind can be just as important as better materials in reducing fence construction costs and in assuring long service life with a minimum of maintenance.

Several important steps in fence construction are described in this publication. The steps are discussed in the order usually followed when building a fence. Most of the recommendations also apply to fence maintenance.

Only wood posts are considered here because studies and experience have shown they are long-lived, and are superior in strength and overturn resistance. Also the wire can be attached easily to wood posts. By power driving, wood posts can be set easily and rapidly.

Not all the details of fence construction are included, and no attempt has been made to discuss all the good ways to build a satisfactory fence. However, if these suggestions based on research and observations are followed, a well constructed, economical fence can be built.

Use Posts with Long Service Life

Durable posts are an essential part of the economical farm fence. Posts used in early fences were cut from the heartwood of naturally durable woods such as eastern red cedar, white and bur oaks, walnut, and northern white cedar. These posts gave 15 to 20 or more years of service. When available, posts cut from the heartwood of these durable species can still be used without treatment.

As the supply of these durable woods decreased and the need for farm fences increased, less durable woods such as red oak, tamarack, birch, aspen, and pine were often used for posts. These posts, when used untreated, usually rotted off within a few years.

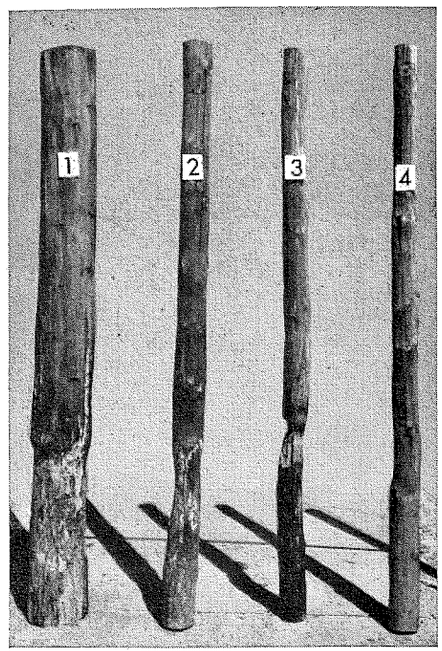
Service tests begun several years ago demonstrated that treated wood posts would give a service life of 20 or more years. As a result, increasing use has been made of treated wood posts, the majority of them treated with creosote.

Most of the commercially treated posts are made from young pine trees which are cut as thinnings from dense stands of second growth timber. These pine posts readily absorb the preservative and when adequately treated will give many years of service in the fence.

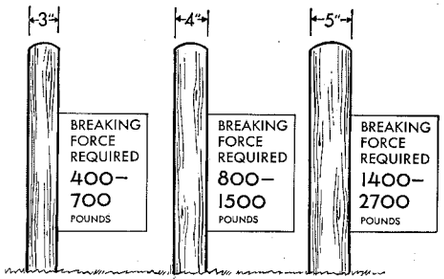
Posts 4 to 5 inches in diameter were commonly used in early fences. As second-growth trees were used for posts there was a trend toward larger diameters which had a greater volume of the more durable heartwood. The untreated wood post, unless cut entirely from heartwood, begins to decay almost as soon as it is set. Both the ground-line diameter and strength of the post decrease rapidly until the time that the post fails.

The use of preservative-treated wood posts again makes it possible and economically desirable to use those of small diameter. The initial size and strength of such posts is retained throughout most of their service life, and 3- to 4-inch posts are adequate for line construction.

When fencing on sandy or very wet soils or on side hills, use 4- to 5-inch posts to get greater overturn resistance. These larger posts are also recommended for contour fencing. Line posts should be 6½ to 7 feet in length. When fencing through ravines, along lakes or streams, and around barnyards, you need 8-foot posts 4 to 5 inches in diameter.



TREATED POSTS LAST LONGER. Posts 1 (8-inch top), 2 (5-inch top), and 3 (3-inch top) were not treated, and Post 4 was treated with an effective preservative. Ground line diameter was reduced by decay after three or four years in untreated posts. Post 4 was in perfect condition after seven years of service.



APPROXIMATE STRENGTH of wood posts. The small values for each size are for northern white cedar while the larger values are for white oak. Jack pine, tamarack, and most other post species fall between these extremes. Strength is computed for a force exerted 4 feet above the ground line on green posts.

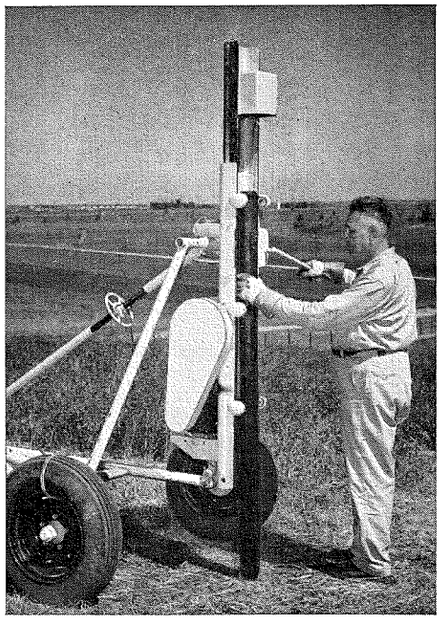
[1] Forester, employed cooperatively by the School of Forestry, University of Minnesota, and the Lake States Forest Experiment Station, U. S. Forest Service.

Set the Corner Posts

Locating the corners, ends, and gates is the first step in building a fence. The permanent corner and gate posts should be set at these points and the fence developed between them.

The large corner, end, and gate posts have in the past been set by hand methods. Setting a single post often took several hours. Anchors of various types were sometimes attached to the bottom and frequently these large posts were set in concrete.

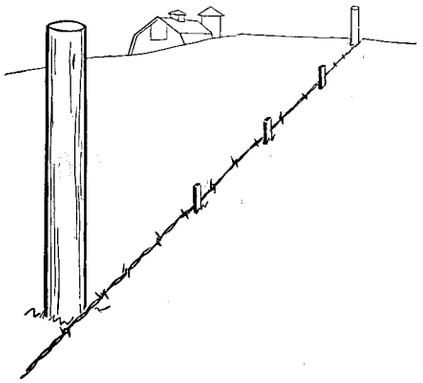
Corner and gate posts can now be power driven in a few minutes. Actual driving time is less than 5 minutes for an 8-inch, 8-foot post set 3½ feet deep in dry soil. Not only can the posts be driven rapidly, but they are set firmly in the ground with all the displaced soil tightly packed around them.



POWER DRIVING corner post with trailer model driver.

Keep Fence Line Straight

A barbed wire stretched tight and straight between the ends or corners is an excellent guide for preparing the holes or setting the line posts. A straighter line usually results from this method than from the older practice of sighting each post. Marking the line with a barbed wire also saves time.



WIRE used as guide for setting posts.

Keep the holes and posts a uniform short distance (few inches) from the wire to avoid disturbing the straight line. Set a few temporary short stakes or pins along the wire to hold it in place against movement by the tractor wheels or blowing by the wind.

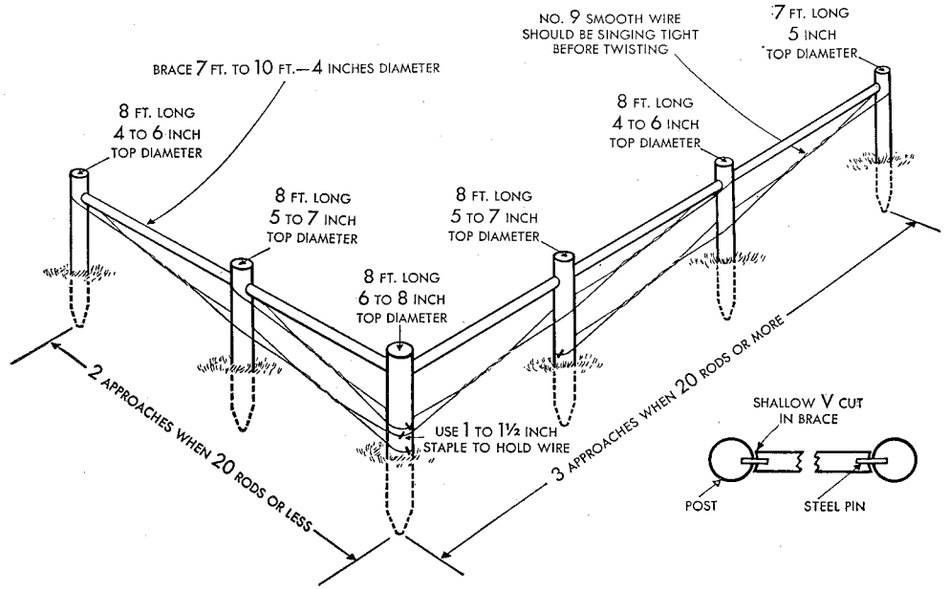
This guide wire can later be used as one of the wires for the fence.

Building the Fence Corner

The corner is the foundation of any fence. You can build the Rosemount corner illustrated (right) with inexpensive small diameter treated wood posts. This corner is easily built.

Cut shallow notches in the ends of the braces. No cutting or notching of the posts is necessary.

Place the braces *parallel* with the ground and near the top of the posts.



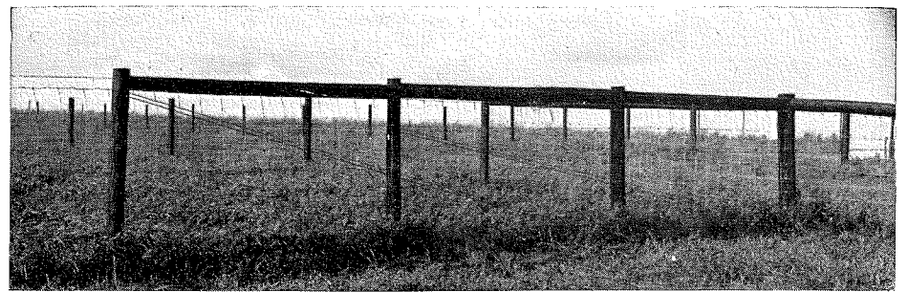
THE ROSEMOUNT CORNER

When they are placed at the top level of the woven wire or the top barbed wire, they help protect the wire when people climb over the fence.

Attach the braces to the posts with pins made from small iron rods or large spikes with the heads removed. Set these pins in holes drilled in the ends of the braces and in the posts.

Splice the brace wire and staple it to the bottom of the corner post. Using a hammer and hardwood block, drive the wire upward on the approach post until it tightens the corner. One or two twists may be added to keep the brace wire close to the fence wire and out of the way of the feet of cattle and horses.

Whether you use three or four posts in the corner and the diameter of the posts will depend upon the length of the fence to be supported, the type and firmness of the soil, and how tightly the wire is to be stretched. Small diam-



ROSEMOUNT CORNER after two years' service.

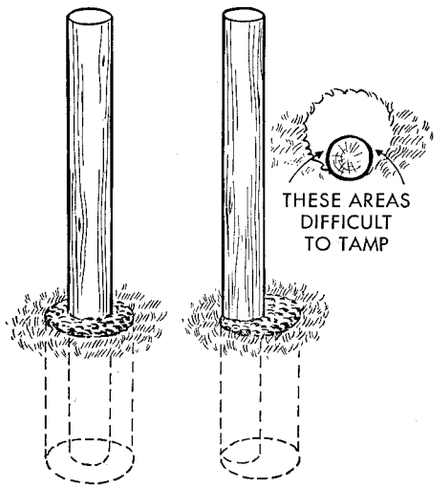
eter posts may be used in heavy compact soils, while larger posts are needed in sandy or wet soils.

All of the posts for the Rosemount corner can be power driven, greatly reducing construction costs. From several years observation, power driven posts appear to be superior to those set by hand methods for corner use.

Corners built on this pattern have successfully withstood several winters of heavy snow damage to the fences they supported. Wind damage to the fence and even breakage of the fence wires by farm machinery have not disturbed the corners.

Setting the Line Posts

In the early fences the holes were dug with a shovel or hand digger and the soil was tamped around the post. Many posts are still set by this method. When the posts are set in the center of the hole, the soil can be tamped securely on all sides. These posts are firm. Posts set against the side of the hole are always loose since the soil cannot be properly tamped.



POWER DIGGING saves much hard work.

With the mechanization of agricultural practices, power post-hole diggers were introduced to reduce the cost of making the holes, but the big job of tamping the post remained.

The power post driver completely mechanizes the setting of the posts and does a better job than hand methods.

POWER DRIVING line posts.

Not only can the posts be driven rapidly but they are set firmly in the soil.

Posts to be power driven should be relatively straight. Crook or sweep should not exceed the diameter of the post.

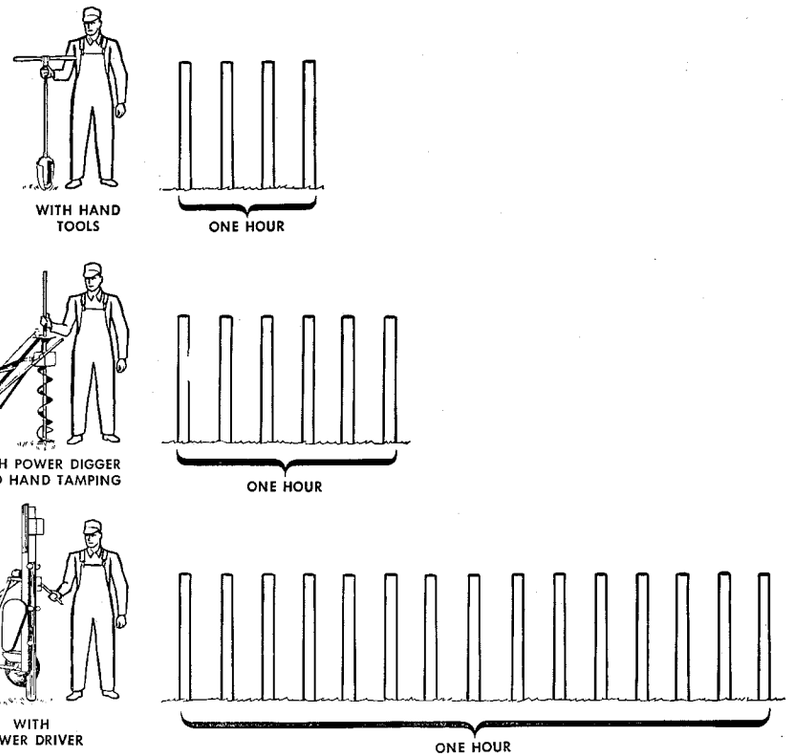
Posts to be driven should have a blunt point on the **large end.** This makes it easier to drive them in any soil. The point aids when driving in rocky and root-filled soil by helping to by-pass obstructions.

The posts may be pointed with a lathe-type sharpener. Or four sloping cuts can be made with a common circular wood saw to provide a satisfactory point. Pointing with an axe is satisfactory but slow.

The **large end** of the post should be pointed to place the maximum diameter at the ground line. Slight rounding of the top end of the post adds to the

Lathe sharpened

Power saw sharpened



HAND METHODS vs. POWER POST SETTING.

appearance of the fence but is not necessary.

Set the posts at least 2 feet in depth—preferably deeper.

A spacing of 14 feet or less is recommended for line posts for snow conditions such as occur in Minnesota. Closer spacing of posts give greater protection to the wire and staples.

To space line posts evenly, tie a piece of rope around the tire on the power driver or tractor and count the revolutions while moving between posts.

Cost studies indicate a man with hand tools can set about four posts, on the average, for each hour of labor.

When the holes are dug with a power post hole digger and the posts tamped by hand, six posts can be set per man hour. Power digging is much easier than hand digging, but tamping is still hard work.

The power post driver makes it possible to set 15 posts per man hour. Operating the power post driver is physically easy when compared to hand digging and tamping.

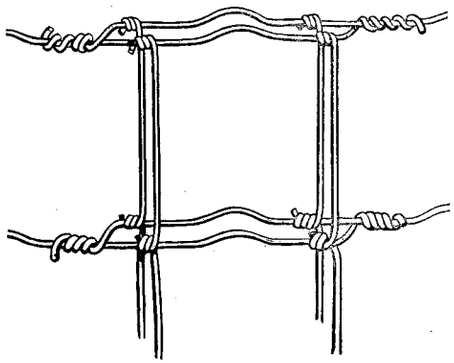
Power driving of wood posts is feasible in any soil where holes can be dug.

Splicing the Wire

The wrap or telephone-type splice is strong, will not cause damage or breakage of the wire, and is easy to make either by hand or with a simple splicing tool.

When splicing woven wire, overlap one section to provide a good hand hold while wrapping the splice.

Do not pull wire around a corner. Cut and tie it with a wrap similar to the wrap splice.



WRAP SPLICE woven wire.

Stretching the Wire

Wire is seldom damaged by hand stretching. When tractors are used for stretching, both barbed and woven wire are frequently damaged by pulling the wire too tight.

Between the warmest days of summer and the coldest days of winter a fence wire 40 rods long will contract several inches. When woven wire is properly stretched the "hump" between the stays will absorb this contraction and will retain the tension as the wire expands again during the following summer.

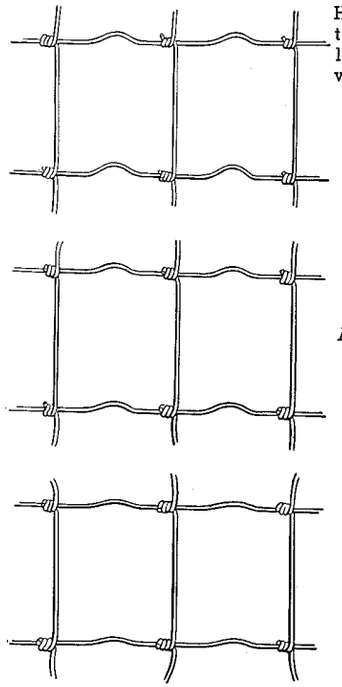
When the hump is lost through stretching too tightly, the wire will be permanently stretched leaving a loose fence as the wire expands the following summer. When the wire is stretched too tightly, it often breaks. Unless well built, the corners may be damaged. The posts in contour fences and draws and ravines are often pulled out of line or lifted by wire which is stretched too tightly.

WRAP SPLICE barbed wire.

Unfortunately, barbed wire does not have a built-in gauge like the hump in woven wire to tell when it is tight. When barbed wire is stretched by hand it usually will not be too tight. Power stretching of barbed wire is not recommended.

There is a tendency to stretch wire too tight in hilly country. You can partially avoid this by stretching short sections of the fence at a time. Always place wire on the inside of the pasture fence.

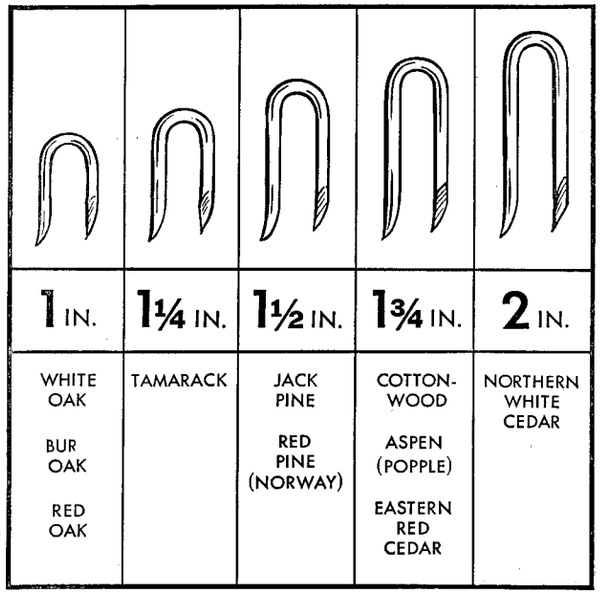
When fences are near driveways or lanes where the snow is plowed, place the wire on the side of the posts away from the road and use short staples. The staple may be pulled by the snow and will need to be replaced in the spring, but the wire usually will not be damaged. When restapling, move the wire slightly from its previous position to avoid its old staple holes.



Choosing the Staples

Most treated wood posts are made from pine or other softwoods. To reduce pulling out, use staples 1½ to 2 inches long. Staples should not be driven their full length so it is necessary to recommend longer staples than formerly were used.

Galvanized staples are preferred. Not only do they resist rusting but they also retard rusting of the attached wire. Furthermore, there is evidence that galvanized staples remain imbedded in the wood more firmly than ordinary staples.



SUGGESTED STAPLE SIZES for common species of wood posts.

Attaching Wire to Posts

Attaching wire to the wood post is one of the most important steps in building a fence.

Slope the staple against the pull of the wire and suspend the wire in the V-notch against the post. For level ground and over knolls, slope the staples downward. In draws where the wire tends to lift, slope the staples upward.

Staples can be made more secure by angling them slightly from parallel to the side of the post. This will reduce splitting, especially in small treated posts.

Staples should not be driven tight. The wire should always be free to move through the staple. Tight stapling not only damages the wire at the point of contact but also limits seasonal expansion and contraction of the wire between posts.

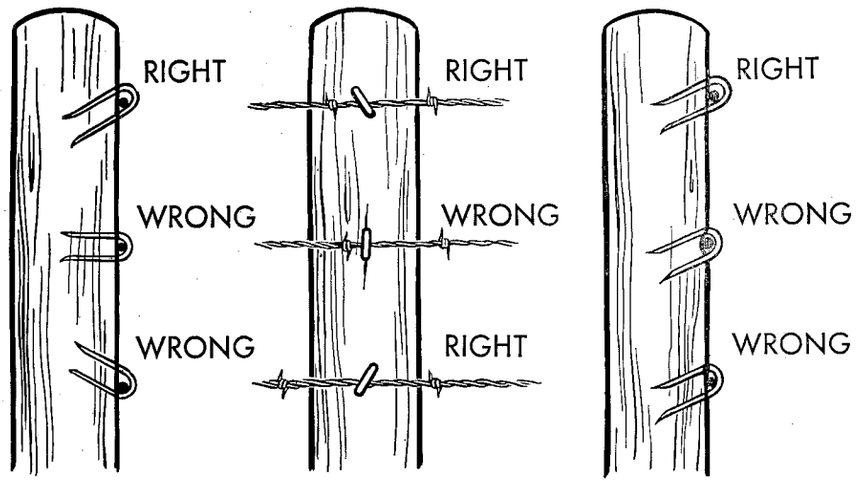
Tight stapling also increases the damage when the wire is bumped by farm machinery and livestock. On corner construction, however, drive the staples even with the wire to distribute the pull against the entire corner.

Except on corners, staples should never be placed over or adjacent to barbs on barbed wire or the stay wires or ties on woven wire, since this restricts free horizontal movement of the fence wire.

When stapling woven wire, staple the top and bottom wires at each post. Also staple every other wire between, alternating on successive posts.

When stapling the fence it is best to start about midway between the corners or ends and staple toward each end. This will give uniformly tight fence wire.

A heavy canvas carpenter's apron is a safe and convenient way to carry staples when fencing. One pocket can be used to accumulate old staples and short ends of wire.



Safety in Fencing

Building and repairing fences often results in serious cuts and tears of the skin. These injuries usually are ragged, difficult to heal, and frequently result in serious infections.

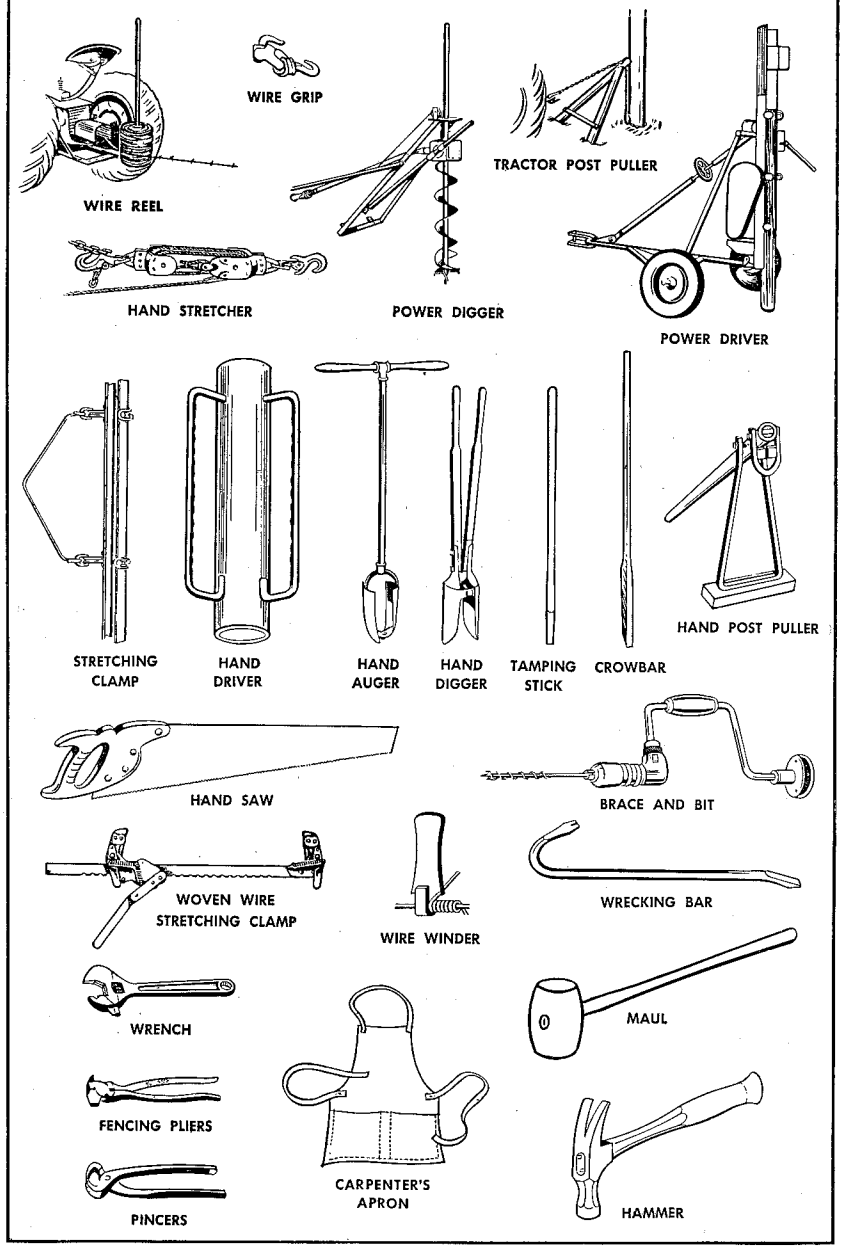
Most of the injuries that result from fencing can be prevented by a few simple precautions.

1. Use close-fitting tough clothing when fencing—loose, ragged clothing easily catches on the wire.
2. Use extra heavy gauntlet-type leather gloves.
3. Wear high-top boots for maximum protection to the ankles and legs.
4. Keep chains and clamps used to stretch wire in good condition and attached properly.
5. Stand on the side of the posts opposite from the wire when stretching it. The wire may break or the clamps or chains slip and it is dangerous to be caught in the twisting, rolling wire.
6. Don't carry staples in pants pockets. The sharp points puncture the pocket and the skin beneath.
7. Put shields on power shafts when using power digger.
8. Keep children away from all fence building operations.
9. Don't rub your hands or gloves which have handled treated posts on unprotected skin. Some people are allergic to one or more of the preservatives used in treated wood posts. The face, neck, and other exposed skin may be irritated, especially on hot, windy, sunny days. A good skin lotion will usually give adequate protection.

Steps in Building Good Fences

1. Locate the corners, ends, and gates.
2. Choose durable posts—such as treated wood posts — for long service life.
3. Use 3- to 5-inch, 6½- to 7-foot posts for line construction. Use 4- to 6-inch 8-foot posts for corner and gate construction.
4. Set permanent posts at corners, ends, and gates.
5. Use a tightly stretched barbed wire between the ends, corners, and gates to build a straight fence.
6. Provide a good foundation for the fence with properly constructed corner and end sections using small treated wood posts.
7. Use a power post driver to set the fence posts easily and economically.
8. Use the wrap splice for connecting the wire.
9. Don't stretch the wire too tightly. Stretch woven wire so as not to remove more than ¼ of the hump from the horizontal wire. Do not use machinery to stretch barbed wire.
10. Use 1½-inch or longer galvanized staples for treated pine posts.
11. Slope the staples into the wood against the pull of the wire.
12. Drive the staples at a slight angle from parallel with the side of the post.
13. Do not drive the staples tightly against the wire. The wire should be free to move through them.
14. Remember fencing is hazardous work. Wear heavy leather gloves, and avoid cuts or torn skin.

Tools Used in Fencing



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